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Point-of-Care Ultrasonography and Office Cystoscopy in Gynecologic Oncology OPD: A Case Series Demonstrating Feasibility, Diagnostic Yield, and Impact on Treatment

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Abstract

Background: Training of gynecological oncology surgeons in handling and utilization of point of care diagnostic and interventional equipment in patient care can be an effective adjunct to the wide range of their expertise. This also prevents delays in diagnosis and treatment. The experience and outcome of patients who underwent point of care ultrasound guided procedures and cystoscopy in the gynecological oncology OPD, at a dedicated cancer institute is being described in this case series.

Objective: This study evaluated the feasibility, efficacy, and clinical impact of POCUS-guided procedures and office cystoscopy diagnosis and treatment in a gynecologic oncology outpatient setting.

Methods: This prospective case series included patients presenting to a gynecologic oncology OPD between May 2023 and April 2024. Patients requiring diagnostic confirmation or therapeutic intervention underwent POCUS-guided interventions (FNAC, biopsy, cyst aspiration, paracentesis). Suspected bladder involvement in cervical cancer cases was evaluated using office cystoscopy. Outcomes included feasibility, diagnostic sensitivity and specificity and its impact on treatment decision-making.

Results: Foty one patients were included (26 POCUS-guided procedures; 15 cystoscopies). Cytological or histological confirmation was achieved in most abdominal malignancy cases, with early initiation of treatment. Therapeutic interventions using ultrasound were feasible in the OPD and improved performance status in critically ill patients. Office cystoscopy enabled same-visit staging decisions, avoiding delays associated with referrals. No major complications were reported.

Conclusion: POCUS and office cystoscopy are feasible, effective, and resource-efficient tools in gynecologic oncology OPD settings, enabling early diagnosis, symptom palliation, and expedited treatment initiation.

Keywords: Point-of-care ultrasound, cystoscopy, gynecologic oncology, outpatient procedures, low-resource settings, cancer diagnosis, POCUS

Introduction

Cancer care in low- and middle-income countries is often hindered by delays in diagnosis, staging, and treatment initiation. These delays are multifactorial, including financial constraints, limited access to specialized diagnostics, and logistical barriers such as multiple hospital visits.[1-4]

Point-of-care diagnostics have emerged as a transformative approach to delivering timely care. Portable ultrasonography and office-based endoscopic tools now allow clinicians to perform diagnostic and minor therapeutic procedures during outpatient visits.[5] In gynecologic oncology, procedures such as ultrasound-guided fine needle aspiration cytology (FNAC), biopsies, and diagnostic cystoscopy are traditionally dependent on referrals, leading to delays. [6,7]

Fischerova et al found that ultrasound-guided tru-cut biopsy is a safe, reliable, and cost-effective outpatient procedure, yielding adequate samples for histology and immunohistochemistry, and is suitable for confirming both primary and recurrent abdomino-pelvic tumours.[8] Malmstrom et al. compared FNAC with BRI-guided biopsy, reporting positive predictive values of 96% and 100%, respectively, with negligible complication rates. FNA combined with BCI is a simple and safe technique for gynaecologic lesions.[9] Although BCI has lower sensitivity than FNA cytology, it shows higher specificity, with no significant difference in overall accuracy between the methods. BCI should be considered when additional tumour information is needed to plan treatment for recurrent disease. The ISUOG-ESGO consensus recommend "among all imaging methods, ultrasound should be considered the first choice for guidance of biopsy, because it provides real-time imaging, is versatile and allows a multiplanar view." [10]

This case series evaluates the hypothesis that POCUS and point-of-care endoscopy in gynecologic oncology OPD settings improve diagnostic efficiency, reduces time to treatment, and enhances patient outcomes, particularly in resource-constrained environments**.**

Methods

Study Design and Setting

A prospective case series conducted in a dedicated gynecologic oncology outpatient department between May 2023 and March 2025.Patients presenting on designated OPD days with suspected gynecologic malignancies requiring tissue diagnosis advanced disease with effusions or poor performance status and suspected bladder involvement in carcinoma cervix Interventions that were performed were POCUS-Guided Procedures FNAC, Core needle biopsy, cyst aspiration/reduction, ascitic and pleural fluid drainage, office cystoscopy performed using a portable flexible cystoscope for, Suspected bladder invasion, Vesicovaginal fistula, post-treatment evaluation. The procedure technique incorporated local anaesthesia (2% lignocaine topical/infiltration), procedures were performed in OPD setting 20-22 gauge fine needles were used for FNAC and cust aspiration while 18-gauge disposible core biopsy needles were used for core biopsies, cytology/biopsies were processed via institutional pathology services. Outcomes measured were diagnostic yield, time to treatment initiation, symptom palliation, feasibility and safety.

Results

Patient Characteristics

Total patients included in this series is 41 with POCUS group including 26 and cystoscopy group including 15 patients. Patients were as young as 22 years and as old as 68 years. The most diagnosed tumour was high grade serous ovarian with 2 cases of mucinous tumours.

POCUS-Guided Procedures

Malignancy was confirmed cytologically in 3 patients while core biopsies confirmed diagnosis in 10 of the cases. Pleural fluid cytology confirmed metastasis in all 4 cases. The USG guided interventions resulted in early initiation of neoadjuvant chemotherapy in advanced cases, improvement in performance status post paracentesis and differentiation between malignancy and benign/inflammatory conditions (e.g., tuberculosis) with initiation of appropriate treatment. The therapeutic benefit of US guided procedures was symptom relief (ascites, pleural effusion) and avoidance of unnecessary surgeries in benign cases.

Office Cystoscopy

The diagnostic utility of office cystoscopy was accurate identification of bladder invasion vesicovaginal fistula and absence of mucosal involvement while the clinical impact was Same-visit staging confirmation and Immediate treatment allocation (radiotherapy vs palliative care) with avoidance of urology referrals and repeat visits

The procedures were well tolerated by patients with no major adverse events and no major complications reported under local anaesthesia.

Cost-Effectiveness and Efficiency Analysis

A combined economic and operational analysis was performed comparing point-of-care (POCUS-based) diagnostics with conventional referral-based pathways.

Unit Cost Comparison

Procedure	OPD Point-of-Care Cost (INR)	Conventional / Package Cost (INR)	Cost Difference
USG-guided biopsy/FNAC	1,750	5,520 (Ayushman Bharat USG package)	**–3,770 (68% reduction)**
Office cystoscopy	500	Not included in Ayushman package*	—

*Cystoscopy in conventional pathways typically incurs additional costs due to specialist referral, procedural charges, and repeat visits.

Mean time to initiation of chemotherapy after biopsy was 6 days. This represents a substantial reduction compared to conventional pathways, where delays due to referrals and scheduling often extend beyond 2–3 weeks. **The reduction in hospital and diagnostic center visit was reduced by average of 2 visits** (including 1 visit for procedure scheduling 1 visit for report collection), this was subject to availability of consumable resources required for the procedures in the Out Patient Department.

Total Cost Impact (Cohort Level)

- Total POCUS cases: 26
- Estimated direct cost savings: **26 × ₹3,770 = ₹98,020**

Interpretation

Point-of-care diagnostics demonstrated **Significant cost reduction (~68%) Earlier treatment initiation (mean 6 days) Reduced hospital visits (average 2 visits avoided)**. This combination represents a **high-value care model**, particularly relevant in low-resource settings where delays and out-of-pocket expenditure are major barriers to cancer care.

Discussion

This case series demonstrates that integrating POCUS and office

cystoscopy into gynecologic oncology OPD workflows significantly enhances diagnostic efficiency and clinical decision-making. The k**ey findings of this series is rapid diagnosis**. Traditional diagnostic pathways often involve multiple referrals and delays. In this study, **POCUS enabled same-day or early confirmation of malignancy**, particularly in advanced-stage presentations.

2. Early Treatment Initiation

Critically ill patients (ECOG 3) benefited from:

- Immediate diagnosis
- Early chemotherapy initiation
- Symptomatic relief

This is particularly relevant in ovarian cancer, where delays can worsen prognosis.

3. Cost and Accessibility

Point-of-care procedures reduced hospital visits, lowered indirect costs (travel, lost wages) and minimized dependency on specialized departments. Office cystoscopy proved crucial in Differentiating stage IVA disease, avoiding over- or under-treatment, enabling accurate radiation planning and detecting post radiation changes. The study reinforces the importance of cross-training gynecologic oncologists in imaging and endoscopy, reducing fragmentation of care expanding surgeon capability.

Although POCUS is well established in emergency medicine and critical care, its application in gynecologic oncology OPD settings remains underreported. This study adds real-world evidence supporting its integration into cancer care pathways. In addition to cost savings, point-of-care diagnostics significantly improved treatment timelines and reduced healthcare utilization. The mean time to initiation of chemotherapy following biopsy was 6 days, reflecting expedited diagnostic workflows. Furthermore, an average of two hospital visits per patient were avoided, including visits for procedure scheduling and report collection. These reductions are particularly relevant in low-resource settings, where indirect costs such as travel and loss of wages substantially impact treatment adherence. Together, these findings highlight the dual benefit of point-of-care approaches in improving both economic and clinical efficiency.

This study is limited by a small number of patients who were assessed by one gynecological oncologist and a better economical evaluation can be done by comparing them with the cohort of patients who underwent guided biopsies in the radiology department or another center. The outcome of the disease was not affected since this is only a diagnostic procedure. Studies on health economics of government financing schemes have outlined the pressing need for diagnostic packages and have suggested various methods of circumventing this issue. The maximal ceiling of the most common scheme the PMJAY is often only sufficient to provide basic cancer care including surgery, chemotherapy and radiation therapy in mostly the public sector hospitals where treatment is already discounted.

Point-of-Care Ultrasound & Cystoscopy as a Value-Based Care Model in Gynecologic Oncology

Value-based healthcare emphasizes maximizing patient outcomes relative to the cost of delivering care. The integration of point-of-care ultrasonography (POCUS) and office cystoscopy into gynecologic oncology outpatient services represents a practical and scalable model aligned with these principles.

In this study, the implementation of point-of-care diagnostics demonstrated improvements across all three core dimensions of value-based care:

1. Improved Clinical Outcomes: Rapid confirmation of diagnosis in the majority of cases. Early initiation of systemic therapy (**mean 6 days to chemotherapy**).Symptom palliation (e.g., ascites and pleural drainage). Functional improvement in high-risk patients (ECOG improvement observed)

2. Reduction in Cost of Care: 68% reduction in procedural cost for USG-guided biopsy, elimination of referral-related expenses for cystoscopy, decreased indirect costs of**, t**ravel, loss of wages **c**aregiver burden.

3. Enhanced Care Delivery Efficiency reflected by same-visit diagnostic and staging decisions with an a**verage of 2 hospital visits avoided per patient**, reduced dependency on multiple departments (radiology, urology), streamlined OPD workflow

Value Equation (Conceptual Framework)

At its core, this model improves the value equation:

$$\text{Value} = \frac{\text{Clinical Outcomes} + \text{Patient Experience}}{\text{Cost} + \text{Time}}$$

In the present study:

- **Outcomes improved** → early treatment, accurate staging
- **Costs reduced** → direct (₹3,770 saving per biopsy) + indirect
- **Time reduced** → 6-day treatment initiation
- **Patient experience improved** → fewer visits, faster care

System-Level Implications

This model has important implications for cancer care delivery, particularly in low- and middle-income countries by **decentralization of diagnostics which** reduces burden on tertiary services. **Task-shifting to trained oncologists:** minimizes interdepartmental delays. **Improved access to timely care:** especially for patients with poor performance status. **Alignment with public health schemes (e.g., Ayushman Bharat):** by reducing out-of-pocket expenditure

Scalability and Generalizability

The point-of-care model is **Low-cost** (portable equipment, minimal infrastructure), **High-impact** (diagnosis + treatment decision in single visit), **Replicable** across: Government hospitals, District cancer centers, Resource-limited oncology units

Conclusion of Value-Based Framework

Point-of-care ultrasonography and office cystoscopy transform the gynecologic oncology OPD into a **high-value care delivery unit**, achieving better outcomes, lower costs and faster care. This integrated approach represents a **paradigm shift from fragmented, referral-based diagnostics to patient-centered, value-driven oncology care**.

Future Directions

Prospective comparative studies including a cost-effectiveness analysis with training in modules for gynecologic oncologists. The ultrasonography can be a good adjunct for assessment of pelvic extent of gynecological cancers especially cervix and endometrium. There are guidelines that recommend this mechanism of evaluation in appropriate cases.

Conclusion

Point-of-care ultrasonography and office cystoscopy are **feasible,**

safe, and highly effective tools in gynecologic oncology outpatient settings. They enable rapid diagnosis, facilitate early treatment initiation, provide symptom relief, reduce healthcare costs and delays.This model is particularly valuable in resource-limited settings and even otherwise and should be considered for wider adoption and further prospective evaluation.

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